Lecture Module - Electrical Signals

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering

Tennessee Technological University

Topic 1 - Classification of Waveforms

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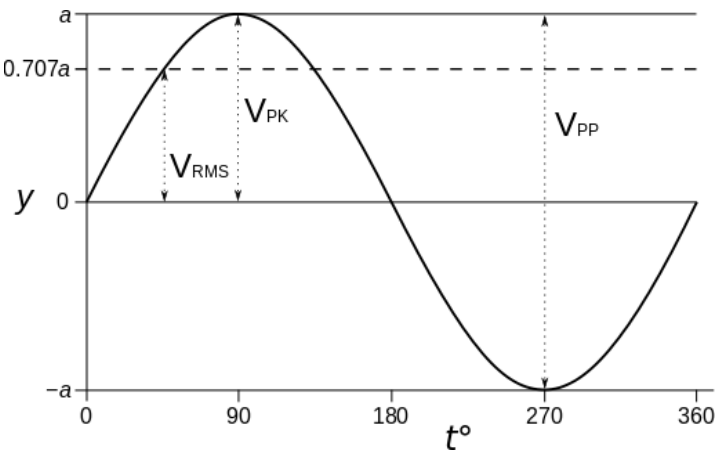
- Introduction
- Three Classifications
- Analog Signal
- Discrete Time Signal
- Digital Signal

Introduction

Signal, Amplitude, and Frequency



The shape and form of a signal are often referred to as its waveform. The waveform contains information about the magnitude and amplitude, which indicate the size of the input quantity, and the frequency, which indicates the way the signal changes in time.

Text: Theory and Design for Mechanical Measurements

Introduction

A signal is the physical information about a measured variable being transmitted between a process and the measurement system, between the stages of a measurement system, or as the output from a measurement system.

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Three Classifications

- **Analog Signal- magnitude is continuous in time**
- **Discrete Time Signal- magnitude at points in time**

  - sampling at repeated time intervals
- **Digital Signal- exists in discrete points in time**

  - magnitude is also discrete

Analog Signal

Analog describes a signal that is continuous in time. Because physical variables tend to be continuous, an analog signal provides a ready representation of their time-dependent behavior.

Examples:

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Discrete Time Signal

...a discrete time signal, for which information about the magnitude of the signal is available only at discrete points in time. A discrete time signal usually results from the sampling of a continuous variable at repeated finite time intervals.

Examples:

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Digital Signal

A digital signal has two important characteristics. First, a digital signal exists at discrete values in time, like a discrete time signal. Second, the magnitude of a digital signal is discrete, determined by a process known as quantization at each discrete point in time.

Examples:

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